equipment – for the information superhighway.[1] It will be the link to the information age of the 21st century. As such, it will combine all of the dynamic technological developments at the intersection of computing networks (the Internet), video, and telephony. Thus, digital TV is increasingly viewed as a high-powered communications device connected to a high volume communications "pipe" delivering not only entertainment, but also interactive communications and e-commerce.

The economic forces that are shaping digital TV involve customer equipment that is more expensive than has been the norm and substantial system upgrade costs. Offsetting these costs is the ability to deliver a large volume of services in an interactive environment. This creates a huge commercial potential. A dramatic increase in capacity and the ability to target consumers with information and advertising as well as to sell on the spot suggests that revenue streams will grow dramatically.

The cost to consumers of watching TV can be measured today in three areas – appliance costs, subscription fees and advertising. These three revenue streams that support the delivery of video services will persist in the digital age; they will simply become bigger to offset the higher costs of service delivery. The ways they will become bigger are of substantial consequence to consumers.

A. Appliance and Industry Upgrade Costs

The costs of the switch from conventional to digital TV are both direct and indirect. Direct, out-of-pocket costs include the cost of the DTV equipment, such as new TV sets or set-

[1] A.T. Kearney, *Digital Television in a Digital Economy: Opportunities for Broadcasters* (National Association of Broadcasters, April 1998), Chapter 1, notes that "the advent of digital television will place broadcast stations in the midst of the digital economy."

top box converters, and service subscription fees, resulting from broadcaster and network operator needs to cover the expenses of converting their equipment to digital capability, a multi-billion dollar venture. Indirect costs include the costs of advertising.

The cost of early HDTV equipment has been exorbitant -- inaugural HDTV sets at $8,000 in retail price[2] and current prices in the range of $2,000-$4,000.[3] Programming has been minimal. Yet experts remain confident that within 15 years all television broadcasting in the United States will be digital[4] and that two-thirds of households will own some sort of digital device.[5]

Station conversion costs are estimated above $5 to $10 billion for broadcasters and cable TV network upgrade costs are in the tens of billions of dollars. As increased attention has been placed on digital television's emergence into the mainstream market, increased concern has been expressed about the cost of this new entertainment and communications appliance. It has become clear that HDTV may very well be a service attainable for only a small percentage of the wealthiest households.

B. Subscription Fees

[2] Advisory Committee on Public Interest Obligations of Digital Television Broadcasters: The Origins and Future Prospects of Digital Television; www.benton.org/PIAC/sec1.html

[3] "Profile with Bob Wright: The Agony Before the Ecstasy of Digital TV," *Digital Television*, April 1999, p. 40.

[4] Maxwell, Kim. *Residential Broadband: An Insider's Guide to the Battle for the Last Mile* (John Wile: New York: 1999); pp. 9-10

[5] Higgins, John, "Cable-digital Marriage a Blessing," *Broadcasting and Cable*, May 3, 1999; Morgan Stanley Dean Witter, *The Digital Decade*, April 6, 1999.

These large conversion and upgrade costs raise concerns that subscription fees will increase in frequency and rise in costs.[6] There is a concern that subscriptions will become a more important source of revenue for the television industry than ad sales, which presently make up 55% of revenue. By breaking the digital signal into a number of channels, broadcasters will seek to require consumers to pay for several of these. The shift to subscription fees will cause even higher direct costs for DTV consumers.[7] Cable and satellite services (DBS), which already charge fees for service, will increase their fees in addition to adding more pay-per-view services.

As digital TV expands the capacity to deliver programming and the convergence of communications, computing and TV entertainment takes hold, pay-TV services are expected to increase in number and price. The new services could be expensive because of the studio equipment necessary to produce programming that takes advantage of the new appliance and also because the infrastructure necessary to deliver interactive services is expensive. Whether the signals are broadcast over-the-air or with cable or satellite technologies, subscription services are expected to proliferate and subscription fees are expected to rise.

Another area of concern is that vigorous marketing of new services and options for consumers may lead to additional costs. Consumers will have many more services to choose from, from high-definition programming and multicasting of niche-audience channels to near-video-on-demand to computer-interactivity.[8] The strengthened technology could result in the offer of more products to consumers in the form of Digital TV programming packages. The

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[6] Davis, Jim. April 21, 1999, Zdnet.com; *Seminal TV Firm Sarnoff Goes Digital*

[7] Digital Terrestrial, p. 5.

> it will (some say must, if it is to prosper) change the norm in TV from free-to-air to Pay-TV: digital TV will be in effect, Pay-TV, with free-to-air channels in the minority

ability to deliver large numbers of channels with specialized packages leads to an effort to tailor and personalize offerings.[9] This creates choice for consumers, but the choices can be influenced or controlled by the provider. This control can come in one of three ways – suggestions made by programmers, [10] control over interfaces with electronic programming guides,[11] or discriminatory policies with respect to programmers who are not affiliated with the cable system owners.[12]

C. Advertising Revenue

Advertising will be transformed in the digital age. In order to generate more revenue to programmers, advertisers must be convinced that their advertising will produce more sales. Current thinking is that the best way to improve the effectiveness of advertising is to target it

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[8] Advisory Committee on Public Interest Obligations of Digital Television Broadcasters: The Origins and Future Prospects of Digital Television; www.benton.org/PIAC/sec1.html

[9] Menezes, Bill, "Replay, TiVo Get Cash for Consumer Push," *Multichannel News*, April 5, 1999, p. 48.

> Investors and programming partners believe that by enabling subscribers to record shows, to search channel content for genre- or actor- specific programs and to create their own customized program line-up the boxes and recording devices will drive viewership and new subscribers to premium and pay per view channels.

[10] Shaw, Russell, "'Tapeless' VCR Does the Thinking for Viewers," *Electronic Media*, April 5, 1999, p. 18 (Hereafter 'Tapeless' VCR Does the Thinking for Viewers).

> TiVo will off "Showcases" that will make on-screen suggestions to viewers about possible taping choices. It will base these recommendations on technology that will compare aspects of certain shows to others. It will automatically deduce, for example, that people who have taped a spy movie might like to record other movies in the genre.

Salfino, Catherine Setting, "TiVo and Replay Hope to Change the Way We Watch TV," *Digital Television*, February 1999, p. 29.

> TiVo explains that it has to charge the service fee because it is providing an "intuitive service that learns what you watch" (something that constantly changes) and presents it to the viewer.

[11] Weightman, Donald, "The Broadband Internet Wars," *Slashdot,* July 20, 1999.Markoff, John, "Microsoft Hunts Its Whale, the Digital Set-Top Box," *New York Times,* May 10, 1999. Boersma, Matthew, "Microsoft, @Home Make Broadband Pact," *ZDNET*, May 13, 1999.

[12] Consumer Action and Consumer Federation of America, *Transforming the Information Superhighway Into A Private Toll Road* (September 1999).

better.[13] Interactive digital networks create the possibility of generating the information necessary to identify individual preferences and tailor the message – either by delivering it selectively to a higher probability audience or by making it more appealing. Not only can advertising be targeted better, but also interactivity makes it easier to buy the advertised product.

In a sense, a new advertising industry may be is born in the transition to digital TV. The only way in which a dramatic increase in advertising can be accomplished is through a fundamental change in the nature of the activity. Advertising revenues are driven by the ability to sell, and digital TV changes the business of selling through television. The huge transformation of advertising is driven by two characteristics of the new advertising medium – the immediacy of the purchase and the targeting of the message.

One key factor in increasing the likelihood that advertisers will sell their products is the ability of the viewer to purchase instantaneously or to otherwise establish an immediate connection with the advertiser. Instead of having to dial a number or write a letter, the consumer is only one click away from the purchase. The connection can be made immediately from the device on which the advertisement is being viewed and without ever leaving the context of the advertisement.

The second key characteristic that transforms advertising is the ability to use information about the consumer to target the advertising. Advertising can be imbedded and tailored not only to the specific type of program being watched, but it can be correlated with information about the viewer that has been gathered over the course of previous viewing sessions and interactions.

[13] Van Orden, Bob, "Top Five Interactive Digital-TV Applications," *Multichannel News*, June 21, 1999, p. 143, Kearney, Chapter 4.

Detailed information is available at the subscriber level within the digital set-top box to allow highly targeted marketing. The technology not only allows the consumer to select and store preferred programs, but it could allow consumer specific advertising to be inserted.

A whole new approach to advertising is made possible by the detailed information and high level of control over the flow of images and information. Advertisers can insert their promotions into a stream of bits in real time or in play back. Live video insertion has already aired in prime time.[14] Technology with the capability to insert specific advertising into programming that is being recorded for later playback is already being marketed.[15]

With this level of control, the potential for forced, banner-type advertising that cannot be fast-forwarded grows. Advertising can be embedded in program and targeted to audiences so that it must be viewed.

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[14] Berger, Robin, "Digital Technology Virtually Blurs Reality," *Electronic Media*, April 5, 1999, p. 14.

> Sports fans have seen the handiwork of Princeton Video Image, the Sengali behind the Southwest Airlines pre-season logo and the Bravo sign behind home plate at Qualcomm Stadium. Neither appeared in real life...
>
> Algorithms in the software fix on the recognizable pattern of a landmark and digitally insert artwork track the insertion through the take and keep foreign objects in perspective

[15] 'Tapeless' VCR Does the Thinking for Viewers, p. 18.

> Both services are basing their revenue model on their capability to handle proprietary advertising that could run in the interface the viewers would see during playback.
>
> "We are also a back channel with an opportunity for different forms of transaction interactivity," Mr. Plant [director of marketing for Replay Networks] says. "There could be advertising, [or an invitation] to receive a brochure."
>
> Adds Mr. Hitt [TiVo's director of product marketing management], "We'll offer advertisers the ability to buy promotions and have them run in front of showcases that consumers want to view."
>
> TiVo's Mr. Harris calls this option "frame-by-frame replacement advertising." An advertiser could place demographically compatible commercial or a "click for brochure" in the stream of a show to be recorded for later viewing by TiVo subscribers – even if the company doesn't advertise on that show.

IV. INVASION OF PRIVACY AND ABUSE OF INFORMATION TO OVERSELL

The sensitivity of consumers to the potential exploitation and abuse of this personalized information has brought forth assurances that the information will be held securely and utilized only in the aggregate. However, it is hard to imagine that this valuable information will sit unused in the set-top box at the fingertips and under the control of the service provider. Since there is a strong need to sell more, it is likely that the information will be exploited to the fullest. Not only will they use it directly, but they may sell it to others.

Concerns about "overselling" also have been raised. Traditionally, restraints on advertising and overselling have focussed on the most vulnerable population – children. The concern is that children are unable to distinguish the advertisement from the entertainment and unable to exercise informed choices. As the advertising becomes more powerful and targeted through the use of personal information and the purchase becomes more immediate through the use of interactive technology, the concern about overselling spreads to the general population.

The concerns about aggressive marketing and overselling arise from two interconnected factors. First, the presentation of choices and alternatives may be manipulated so that the consumer loses control over what is viewed. Second the likely reliance on highly targeted advertising which is built on detailed personal information about viewing and purchase patterns disarms the consumer.

As noted above, the amount of information available to network operators is staggering. It is possible to monitor viewing patterns, including which shows are tuned in, which commercials are skipped, etc. It is also possible to keep records of purchase patterns, which sites are visited, what information is requested and which goods are bought. This information is

extremely valuable to advertisers. One must assume that unless prevented from doing so, they will use it.

The threat to privacy in this commercial model is clear. The privacy protections afforded to telecommunications' consumers in current policy is very uneven.[16] It goes without saying that consumers have a right to control their personal information. Moreover, the vast majority of Americans strongly support FCC measures to protect digital television consumer privacy.[17] In keeping with our focus on pocketbook issues, we ask whether the use of personal information in the context of an interactive, electronic transaction creates a risk of "overselling" by abusing personal information and the intimacy (immediacy, seclusion) of the interactive TV environment.

A. Pre-Purchase Problems

The utilization of detailed consumer information to target the advertising is liable to catch the consumer unaware. Consumers do not expect marketers to have such information. The irony of the fit between the message and the individual consumer may be "disarming," lowering the consumers guard.

Consumers also are confronted with a difficult problem of sorting out the nature of the source of the information when presented in this digital context. Infomercials and advertorials, whose purpose it may be to confuse consumers, will become even more challenging when they are personalized.

[16] Whyma, Bill, "Cable's Data Privacy Rules Stumbling Block for E-Commerce and @Home?", Legg Mason Precursor Research, April 6, 1999.

[17] 80 percent of voters favor FCC guidelines to protect consumer privacy; 83 percent think establishing privacy protetion guidelines is important; Lake Snell Perry, May 1999.

The educational and information gathering process that consumers would normally go through in the pre-purchase phase is distorted by the use of personal information embedded in the interactive context of digital communications. The immediacy of the purchase, which is facilitated by interactivity, may create a condition of urgency and time constraint, which diminishes the tendency of the consumer to search for alternatives. The ability to distinguish between what must be done without delay and what is optional may be limited.[18]

Warning messages about a purchase may not be effective in this context. If they require a consumer to react quickly, like hang up or tune out before billing starts, the message may be missed. Since the purchase decision is not focused on the array of products being offered, warnings and cautions are less likely to be heeded.[19] A lack of involvement may result in confusion.[20]

B. Point-of-Sale Problems

The billing pattern for these services is also problematic. There is a disconnection between the purchase and the bill. Many weeks may elapse between the purchase and the bill. Further, the bill may make it difficult to identify exactly what costs how much. The difficulty of

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[18] Newman, J. W., "Consumer External Search: Amount and Determinants," in A.G. Woodside, J.N. Sheth, and P. D. Bennet (Eds.), *Consumer and Industrial Buyer Behavior* (New York: North Holland, 1977); Newman, J. W. and R. Staelings, "Multivariate Analysis of Differences in Buyer Decision Time," *Journal of Marketing Research* 8, 1971, "Prepurchse Information Seeking for New Cars and Major Household Appliances, *Journal of Marketing Research*, 9, 1972; Claxon, 1974; Beatty, S.E. and S. M. Smith, "External Search Effort: An Investigation Across Several Product Categories," *Journal of Consumer Research*, 14,1987.
Wilkie, 1982; Funkhouser, 1984.

[19] Wilkie, 1987, Funkhouser, 1984.

[20] Jacoby and Hoyer, Laczniak and Grossbart, 1990.

sorting the bill out renders pre-purchase information gathering and post-purchase follow up less likely.[21]

Electronic transactions also frequently allow for little pause to contemplate. When consumers are on-line, over the phone or at the computer, they may feel rushed by tying up the line. On-line environments frequently give warning messages about idle time. Since the transaction is conducted electronically, there is little opportunity for point-of-sale information gathering. Information gathering for later review assists in decision making.[22] No immediate record of the transaction exists and the transaction is not available for public scrutiny.[23]

C. Post-Purchase Problems

It is extremely difficult to police these transactions. Sellers know that the transaction cannot be observed. Consumers do not have records to study or use for dispute resolution. They do not take possession immediately. The bill does not come until some time later. There may also be uncertainty about redress and responsibility for service. The former utility will typically be seen as the responsible party, but that may be correct only under some circumstances. Sorting out whom is responsible for which part of the total service may be difficult. When three or four companies become involved, transaction costs for the consumer can mount quickly.

It is clear that return policies are being influenced by the nature of goods sold in e-commerce. Shrink-wrapped software is the best example. You open the box; it is yours. If it

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[21] Chaiken, S., "Heuristic versus Systematic Information Processing and the Use of Source versus Message Cues in Persuasion," *Journal of Personality and Social Psychology*, 39, 1980;, Zimmerman, L. K. and L. V. Gesfeldt, "Economic Factors Which Influence Consumer Search for Price Information," *Journal of Consumer Affairs*, 18, 1984; Beaty and Smith; Newman, 1977.

[22] Wilkie, 1982.

[23] Bloom.

does not work, you can exchange it, but you cannot get your money back. Why not? The no return policy places more emphasis on the post-purchase phase. If the consumer cannot get his or her money back, then customer service or post-purchase remedies must ensure that the product works.

The physical aspect of returning goods also changes. Goods are generally returned in the way they are purchased. If the consumer got it from a store, he or she will typically be told to return it to the store. If the consumer received it by mail order, the consumer will be required to return it mail order. Credit card transactions will be credited after the returned product is received. If the product was downloaded, is it returned by uploading? Industry analysts and consumer advocates have argued that more vigorous post-purchase remedies are necessary to create confidence in e-commerce transactions.[24]

D. Policy Recommendations

1. Customer Privacy. The FCC should require broadcasters to comply with privacy guidelines that meet the following principals:

a. Notice: Broadcasters must inform their customers in a clear and conspicuous manner when they plan to collect, use, and/or disclose personally identifiable information, and customers must be told the intended recipient of the information and the purpose(s) for which it shall be used.

b. Consent: Broadcasters must receive prior affirmative consent of the customer before it discloses that customer-specific viewing, purchasing or financial information to any third party or affiliate. No customer can be denied any product or services by a broadcaster for refusing to

[24] Consumers International, 1998

give consent to the disclosure of the customer's personal information except where necessary to determine eligibility for a specific product.

c. Access: Customers must have access to personally identifiable information held by the broadcaster to make sure it is accurate, timely and complete and customers must have the ability to correct erroneous information.

2. Purchase Protections/ Abuse of Information to Oversell. As telecommunications and broadcasting technologies begin to converge, so should consumer government oversight. The FCC should consult the Federal Trade Commission and propose comprehensive measures to protect digital television consumers before, during and after the purchase of goods or services. These measures should be consistent with basic guidelines for online commerce developed by the Consumer Federation of America and an international working group of consumer organizations.[25] The FCC should seek specific comments from stakeholders regarding potential remedies aggressive advertising, including:

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[25] Guidelines proposed by the Transatlantic Consumer Dialogue:

1. Consumers should have transparent and effective protections that are at least at the same level as those afforded in other forms of commerce.
2. Businesses should disclose their legal names and physical locations, and provide consumers with an easy means of contacting them, both online and offline.
3. Marketing material should be clearly identified as such in any electronic format in which it is conveyed.
4. Information about the businesses, the products or services they offer, and the terms of the transactions, including price, delivery, payment, taxes, cost of transportation, duties, etc., should be stated in a clear, conspicuous, accurate and easily accessible manner before a consumer is required to give personal information or payment information.
5. Businesses should not make any representations or omissions, or engage in any practices, that are likely to be unfair, deceptive or fraudulent.
6. Businesses should be able to substantiate any claims they make, express or implied.
7. Businesses should develop and implement methods by which consumers can confirm the decision to purchase or withdraw from a purchase before a transaction is completed. Consumers should have no liability for unintentional or erroneous transactions where the business failed to provide an adequate opportunity to correct the error.
8. Businesses should develop and implement methods by which consumers can receive confirmation of their purchases and retain records of the transactions.
9. Businesses must abide by any post-purchase cancellation rights that may be provided by self-regulatory guidelines and the law in consumers' jurisdictions.

a. Post-purchase remedies, including the right of recision to cancel purchases made through digital television for up to three days.

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10. Businesses should develop and implement methods to prevent identity theft and other frauds and verify that payment is being made by the authorized account holder. The burden of proof regarding authenticity should rest with the business and/or payment systems operator, as appropriate. Consumers should be responsible to notify the appropriate entity promptly once aware of possible theft or loss, and should have no liability for transactions they did not authorize.
11. Consumers' payment and other information that they provide to businesses should be secured from theft or abuse.
12. Consumers should have no liability to pay for products or services that were never delivered or were misrepresented. In those events, electronic payment methods should provide for "chargeback rights" and prompt return of any payments made.
13. Businesses should develop and implement simple procedures for consumers to indicate that they do not wish to receive unsolicited e-mails and honor their "do not e-mail" requests.
14. Consumers' privacy rights should be respected in accordance with the recognized principles set out in the 1980 OECD Guidelines Governing the Protection of Privacy and Transborder Flow of Personal Data and taking into account the OECD Ministerial Declaration on the Protection of Privacy on Global Networks.
15. Consumers must have methods of redress that are practical, accessible, affordable, timely and enforceable no matter where businesses against whom they have complaints are located.
16. The countries in which consumers reside have the obligation to protect them in electronic commerce and must guaranty that there are appropriate means for resolving consumers' disputes. Consumers should never be denied the protections and remedies afforded to them by the laws, rules and regulations of their respective jurisdictions.

B. Jurisdiction

Consumers must have access to adequate redress if problems arise when buying goods and services on the Internet. Although the marketplace is global, consumers must have the right to take action before their own national court. Consumers should only be pursued before a court in the consumer's home country. A choice of forum clause in a consumer contract is not enforceable. International co-operation is needed to enforce judgements against companies in cross-border disputes.

C. Alternate Dispute Resolution

Consumers need alternative dispute resolution systems where consumers can file complaints without going to court. Alternative dispute resolution systems to resolve consumer complaints in the context of electronic commerce should be based on these principles:

1. Framework for ADR systems should be set by legislation and presented as a voluntary option for consumers, not a legal or contractual requirement.
2. ADR systems should be easily accessible and convenient. Information about procedures, costs, basis for decisions, and the enforceability of decisions should be provided prominently and clearly.
3. ADR systems should be free or low-cost and operate in an expeditious manner.
4. ADR systems should be independent, operated by reputable third-parties. Personnel should have no direct interests in the disputes or the parties involved.
5. Meaningful enforcement of decisions reached by ADR is essential.
6. Consumers who submit disputes to ADR systems should not be asked to waive their legal rights. Consumers' use of ADR systems should not prevent law enforcement authorities or others from using their cases in actions to stop fraud or abuse.

b. Requiring digital television providers to offer purchase screening options that would, for instance, allow parents to "block" the unauthorized purchase of goods and services by their children.

c. Restrictions on interactive digital advertising directed at children.

V. WIDENING THE DIGITAL DIVIDE

As digital communications become the dominant form of communications, the high costs for the appliance and increasing presence of subscription services may price many consumers out of the market. As a result, they would be cut off from the higher quality services and information sources that are commanding society's resources and attention. High costs of digital TV could solidify the "Digital Divide" that many fear has been growing in America.[26]

Not only could low income and minority groups be denied access to commercial services, but also they could be cut off from the primary driver of economic opportunity as well as the major arena for civic and political discourse in the 21st century.

A. Measuring the Digital Divide

The Digital Divide can be measured in at least three different ways. The Consumer Federation of America and Consumers Union (CFA/CU) recently analyzed the digital divide in terms of the use of communications services – telephone, cable television and Internet. The Clinton Administration has analyzed the digital divide in terms of ownership of computers and

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[26] Cooper Mark and Gene Kimmelman, *Digital Divide: Economic Reality Confronts Public Policy* (Consumer Federation of America and Consumers Union, January 1999); NTIA...

use of the Internet.[27] Social analysts discuss the digital divide in terms of economic skill and employment prospects. All three approaches yield a similar and reinforcing picture of a major and extremely serious division in society (see Exhibit 2).

[27] (Petty, 1998)

EXHIBIT 2:
CHARACTERIZATIONS OF THE DIGITAL DIVIDE

SOURCE	CFA/CU		NTIA		SOCIAL COMMENTARY	
ANALYTIC APPROACH	Digital Divide defined by usage of communications		Digital Divide defined by computer ownership and Internet use		Digital Divide defined by employment skill category	
CLASSES		*% of Pop.*		*% of Pop.*		*% of Pop.*
UPPER	Premier & Internet	24	Computer	26	Symbolic Analyst	20
UPPER MIDDLE	Transitional no Internet	15	Computer	16	Support personnel	20
LOWER MIDDLE	Mobile	16			Casual Middle	30
	}	}	No Computer	58		
LOWER	Modest	45			Bottom	30

SOURCE:
CFA/CU: Cooper, Mark N. and Gene Kimmelman, *The Digital Divide Confronts the Telecommunications Act of 1996: Economic Reality vs. Public Policy,* (Consumer Federation of America and Consumers Union, February 1999).

NTIA: *Falling Through the Net: Defining the Digital Divide*, July 1999.

SOCIAL COMMENTARY: Hall, Peter, "Changing Geographies: Technology and Income," and Manuel Castells, "The Informational City is a Dual City: Can It Be Reversed," in Donald A. Schon, Bish Sanyal and William J. Mitchell, *High Technology and Low-Income Communities* (MIT Press: 1999).

CFA/CU identified a top segment of the population with large communications expenditures, which represents about one quarter of the population. Borrowing a term from industry business models, we called this the premier market segment. A second closely related group we called the transitional group. Taken together, we estimated these two groups as 40 percent of the population.

In the CFA/CU analysis the bottom 60 percent is generally not hooked into the information age. The bottom 60 percent did not have access to the Internet and spent relatively little on communications services. The bottom 45 percent had only one telephone line, no Internet access and no cellular service. Another 15 percent had one telephone line, no Internet access, but did have a cellular phone.

B. The Impact Of The Digital Transition On The Digital Divide

The description of the Digital Divide tells us nothing about how the transition to digital TV, embedded in the broader transition to a digital information society will affect the divide. The obvious concern is that the high cost of acquiring these new services will make matters worse.

The well-established field of diffusion research provides support for this concern. The academic literature on the adoption of innovations certainly suggests that the early adopters will be the wealthier, better-educated segments of the population.

The cost of appliances, relative to income is a major determinant of their diffusion throughout the population. About a decade ago, CFA found that the best approach to understanding affordability is to express the cost of the service (including equipment and monthly charges) as a percentage of income. This captures the two most important variables

that are generally identified in the diffusion literature, price and income. What we found in that earlier research was that an appliance or service needs to drop below 2 percent of income before it becomes affordable.

The belief by at least one TV executive that the TV set needed to be on a price trajectory from $1,000 to $250 is well founded.[28] This is the price trajectory of the VCR, which penetrated very rapidly in the 1980s to reach more than 80 percent in less than a decade. Digital TV is still quite a distance away from this price trajectory. The most recent experience with computers appears to bear this out. After hovering in the $1,000 to $1,500 range for a number of years, a significant price reduction occurred in late 1998 and has persisted through 1999. The average price has dropped to below $900, with many models selling in the $500 range.

With median income in the range of $38,000 a $500 computer is well below 2 percent of median household income. Early indications are that this will increase the penetration of computers significantly.

Even the most optimistic price trajectory of HDTV would leave it at a relatively high level even at the end of the next decade. It will simply not be priced in a manner to be widely affordable and achieve high levels of penetration. The problem is not limited to HDTV, however. Even considering Standard Definition Digital television, affordability is a problem.

The SDTV set is projected in the range of $500 for equipment. This is about twice the price of an analog TV. Moreover, the SDTV is only useful if one subscribes to cable (another $30-$40 per month) and then pays for additional digital services (another $10-$40 per month). The cost of service is driven well above the level where diffusion is rapid.

[28] Bob Wright.

This picture of the likely early adopters had not changed in ten years.[29] It is quite similar to the results one finds in a very long tradition of innovation adoption research.[30] There is a very strong base of support for the importance of income and education in the adoptions of high technology innovations like computers and telecommunications equipment.[31] The strong predictors of inclination to early adoption point directly to market segmentation strategies.[32] In other words, companies introducing technologies can identify the likely adopters and orient their product distribution to maximize the penetration within that market segment.

This observation dovetails with the CFA/CU analysis of the digital divide that focused on the business models that were being applied by the telecommunications companies. CFA/CU found that the competitive energies of the industry are focused on the premier segment, with innovative offerings and consumer friendly pricing, which the remainder of the population is ignored or suffers price increases.[33]

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[29] Dupagne.

[30] Sakar, Jayati, "Technological Diffusion: Alternative Theories and Historical Evidence," *Journal of Economic Surveys*, 12:2, 1998; Martinez, Evan, Yolanda Polo and Carlos Flavian, "The Acceptance and Diffusion of New Consumer Durables: Differences Between First and Last Adopters," *Journal of Consumer Marketing*, 15:4, 19998.

[31] Meeks, Carol B., Anne L. Sweaney, "Consumer's Willingness to Innovate: Ownership of Microwaves, Computers and Entertainment Products," *Journal of Consumer Studies and Home Economics*, 16, 1992; Savage, Scott Gary Madden and Michael Simpson, "Broadband Delivery of Educational Services: A Study of Subscription Intentions in Australian Provincial Centers," *Journal of Media Economics*, 10:1, 1997; Atkin, David J., Leo W. Jeffres and Kimberly A. Neuendorf, "Understanding Internet Adoption as Telecommunications Behavior," *Journal of Broadcasting and Electronic Media*, 42:4, 1998; Neuendorf, Kimbelry A., David Atkin and Leo W. Jeffres, "Understanding Adopters of Audio Information Innovations," *Journal of Broadcasting and Electronic Media*, 42:4, 1998; Lin, Carolyn, A., "Exploring Personal Computer Adoption Dynamics," *Journal of Broadcasting and Electronic Media*, 42:4, 1998.

[32] Sultan, Fareena, "Consumer Preferences for Forthcoming Innovations: The Case of High Definition Television," *Journal of Consumer Marketing*, 16: 1999, p. 37.

[33] Cooper, Mark N. and Gene Kimmelman, *The Digital Divide Confronts the Telecommunications Act of 1996: Economic Reality vs. Public Policy,* (Consumer Federation of America and Consumers Union, February 1999), pp. 3-4.

> Thus, the continuous debate since the passage of the 96 Telecom Act over the need to deploy infrastructure to eliminate the "digital divide" has been significantly misplaced. That expression

Social analysts have expressed similar concerns. They caution that there is nothing inherent in the digital transformation that will alleviate the problem of the digital divide and much that could exacerbate it. In short, the digital transformation does nothing to reduce the economic, personal and social barriers.[34] As the effects of the digital transformation spread, those who do

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has been used to refer to the possibility that some groups of consumers would be cut off from the expanding possibilities of the information age because of a failure of private sector firms to deploy the necessary infrastructure. This paper shows a digital divide from a vastly different perspective.

We present evidence that the market activities of the firms in the industry are creating a divide not on the basis of infrastructure, but on the basis of economics. The current infrastructure is more than adequate to generate a very high stream of revenue and meet the needs of virtually all consumers. The companies appear to be interested in competing for the business of a small segment of the market – intensive users of numerous telecommunications and TV services. The group of consumers who are attractive to companies is quite small. The drive to expand the infrastructure serves the needs of this small group and leaves the rest behind.

If policymakers allow the debate over the high-end markets to drive public decisions about infrastructure deployment, the digital divide will grow, not be reduced. The availability of more infrastructure will expand economic opportunity at the top of the market and reduce the likelihood that companies will have to work their way down the market to increase their economic rewards. Profit maximizers will simply exploit the demand for more service in the upper end of the market more intensity.

This fundamental economic observation is crucial to developing sound public policy. Massive industry consolidation under a law that fails to differentiate areas of likely competitive opportunity from areas of persistent monopoly is leading to a new era of telecommunications haves and have-nots as described below.

[34] Donald Schnook, Bit Sandal and William J. Mitchell, *High Technology and Low-Income Communities* (MIT Press, Cambridge, 1999), pp. 7, 12, 51.

Much advanced service activity depends on what one can call "access to privileged information": whether in the City of London, or Midtown Manhattan, or Silicon Valley, or Hollywood, higher-level information workers spend a lot of their time picking up informal information, much of it semi-gossip, which is vital to the judgement they make about other more formal information...

In these and other similar places we find an extraordinary synergy between telecommunications exchange and face-to-face exchange.

The rise of advanced information technology is unlikely, left to itself, to do anything for low-income people, or the communities in which they congregate. The poor lack access to the economic opportunities that advance information technologies present. This lack of access hinges on issue of transportation, education, work readiness, and computer skills.

Effective access is a multi-layered proposition, consisting of access to the "pipes," the "affordable appliance," the "user-friendly software," and the "will and motivation to exploit all of the above."

not have command of the technology become marginalized. To the extent that they have skills, those skills are devalued and their bargaining power is undermined by the changes in the production process.[35]

C. Public Policy Recommendations

Ultimately, digital divide questions are very large social issues. The Commission's braod policies to promote computer and Internet literacy address the a part of the problem that deals with the human capital aspect of the digital divide.

The Commission should certainly monitor the market to ascertain whether equipment costs are affordable. Having finally crossed the threshold to rapidly expanding computer ownership with the recent declines it price, it would be ironic if the next generation of Internet access became unaffordable because the preferred appliance, the TV plus set top box, shifts the costs to much higher levels.

With respect to content, the Commission should extend the principles of commercial leased access and free, or low cost civic discourse channels. Support for production of new digital/broadband programming with diverse content should also be required.

The Commission should also monitor subscription and pay-per-view charges and reserve the right to requre broadcasters to charge reasonable rates for pay services. Given the costs

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> The real barrier to entry is, in this case, not "physical capital" but human capital, which depends on education, training in computer skills, and job experience; and social capital, which consists of the formation of a network of useful business contacts.

[35] Schon, p. 7.

> If anything, Wolpert sees advanced information technology as driving the working poor and layers of middle management out of the mainstream economy, depriving even more people of its benefits.

associated with offering digital television, it is quite possible that broadcasters will charge for programming that is now offered free. The public would strongly support efforts to keep television programming within reach of average and moderate income families.[36]

IV. THE THREAT TO DIVERSITY AND EXPRESSION WITH A COMMERCIALLY DRIVEN DIGITAL TELEVISION DEPLOYMENT

While the digital divide affects lower and middle income groups, there is a broader concern that the powerful commercial forces that are driving the transition to the digital information age will overwhelm the public purposes served by television. The need to produce and sell commercial programming may squeeze out educational, cultural and informational programming.

A. Concerns about the Impact of Commercialization on Civic Discourse

Though it is unclear when digital TV will appear on the market in full force, consumer advocates have long been involved in debates about the content that will be aired over the revolutionary transmission medium. The transformation of TV is not only quite costly, but also a huge commercial opportunity. Afraid that the new spectrum will result in strictly revenue-making ventures by broadcasters, without regard for the public's interest in new quality

[36] 73 percent of voters support FCC rate regulation of pay-per-view programming; 75 percent think this is important; Lake Snell Perry, May 1999.

programming, consumer groups have attempted to ensure that Digital TV reflects beneficial public purpose.

The transformation of digital TV into a high-cost, high-powered marketing platform raises the prospect of the medium becoming even more highly commercialized than at present. This advances an ongoing commercialization that has been a source of concern.[37]

This traditional public policy debate has it origins in the longstanding public policy of demanding socially responsible behavior from broadcasters who have used a scarce public resource – broadcast spectrum – at no charge. Although it can be argued that spectrum is no longer scarce, there is no question that it is still very valuable and broadcasters use it without paying for it. The nucleus of the debate remains the same. It focuses on broadcasters receiving their new spectrum free of charge, without restrictions in place to dictate how they can use the fresh channels and airtime. Though the FCC has required broadcasters to provide one free channel of programming, the remaining spectrum has not been regulated.

Because policymakers recognize the uniquely important role that broadcast media – radio and later television – play in the marketplace of political ideas and in forming cultural values, policymakers have rejected the notion that economics alone should decide the nature, availability, and content of political and cultural programming. Instead, policy has sought to prevent concentration of economic power from controlling the flow of ideas in the broadcast

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[37] Winsbury, p. 4.

> But we mustn't forget the enormous potential of this new technology: the world's foremost mass-market medium is being allied with mankind's largest library. It is an educational tool on a scale never previously imagined; new forms of drama, comedy and even perhaps art are waiting to be explored; it could offer a voice to all manner of voiceless groups from political parties to local communities and special interest groups; democracy could be enhanced by creating new forums for discussion on every level. It is worrisome that regulators and governments seem to be doing little to ensure that these opportunities aren't wasted. We will have to hope that companies involved in these new services take up the challenge.

media by placing limits on the ownership of media outlets and imposing obligations to expand programming beyond what is simply profitable.[38] In short, what is good enough in the economic marketplace has not been considered to be good enough in the political and cultural marketplace.

B. Economic Pressures on Diversity in the Media

Almost three-quarters of a century of public policy toward the mass media have been predicated on the recognition of the uniquely powerful impact of that media.[39]The digital communications network takes the role of the broadcast media to a higher level[40] adding interactivity to immense reach,[41] real time immediacy,[42] and visual impact.[43] Because it is such a potent method of information dissemination, economic control over mass media can result in excessive political power.[44] Media concentration has an impact on political activity and political

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[38] The Federal Communications Commission, Further Notice of Proposed Rulemaking in the Matter of Review of the Commission's Regulations Governing Television Broadcasting, MM Docket No. 91-221, January 17, 1995, pp. 54-55; Hopkins, Wat W., "The Supreme Court Defines the Marketplace of Ideas," *Journalism and Mass Communications Quarterly*, Spring 1996.

[39] C. M. Firestone and J. M. Schement, Toward an Information Bill of Rights and Responsibilities (Aspen Institute, Washington, D.C., 1995), p. 45; Tempell, Guido H. III, and Thomas Hargrove, "Mass Media Audiences in a Changing Media Environment," *Journalism and Mass Communications Quarterly*, Autumn 1996; Gunther, Albert C. "The Persuasive Press Inference: Effects of Mass Media on Perceived Public Opinion," *Communications Research*, October 1998; American Civil Liberties Union v. Janet Reno, 929 F. Supp. 824 (E.D. Pa. 1996), 117 S.Ct. 2329 (1997).

[40] Shapiro, Andrew, *The Control Revolution* (Century Foundation, New York: 1999).

[41] Bagdakian describes the economic and cultural impact of television as follows (p. 182):

[42]Gigi Sohn and Andrew Jay Schwartzman, "Broadcast Licensees and Localism: At Home in the 'Communications Revolution,'" Federal Communications Law Journal, December 1994; M. Griffin, "Looking at TV News: Strategies for Research," Communication, 1992.

[43] Kathryn Olson, "Exploiting the Tension between the New Media's "Objective" and Adversarial Roles: The Role Imbalance Attach and its Use of the Implied Audience, Communications Quarterly 42: 1, 1994 (pp. 40-41); A. G. Stavitsky, "The Changing Conception of Localism in U.S. Public Radio," Journal of Broadcasting and Electronic Media, 1994.

outcomes because the economic interests of media owners influences their advertising and programming choices[45] -- private interests inevitably attempt to dictate the access to political information.[46]

Relying on economic forces alone will not produce diversified programming adequate to create the rich political and cultural arena demanded by political discourse because the dictates of mass audiences creates a lowest common denominator ethic that undercuts that ability to deliver politically and culturally relevant diversity. [47] Technological answers do not alter the underlying economic relationships.[48] The mass-market audience orientation of the business

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[44] P. C. Washburn, "Top of the Hour Radio Newscasts and the Public Interest," Journal of Broadcasting and Electronic Media, 1995, pp. 74-75.

> Widespread belief in economic competition as the foundation for a genuine "marketplace of ideas" was exploited effectively by the Reagan administration and by powerful corporations such as AT&T, ITT, General Electric, CBS, Capital Cities, and IBM to eliminate much of the regulatory structure of America's communications industry.

[45] Bazelon, pp. 230-231.

[46] W. L. Bennet, News, The Politics of Illusion ((New York: Longmans, 1988); J. C. Busterna, "Television Ownership Effects on Programming and Idea Diversity: Baseline Data," Journal of Media Economics, 1988; E. S. Edwards and N. Chomsky, Manufacturing Consent (New York: Pantheon, 1988); J. Katz, "Memo to Local News Directors," Columbia Journalism Review, 1990; J. McManus, "Local News: Not a Pretty Picture," Columbia Journalism Review, 1990; J. McManus, "How Objective is Local Television News?", Mass Communications Review, 1991; Price, Monroe, E., "Public Broadcasting and the Crisis of Corporate Governance," *Cardozo Arts & Entertainment*, 17, 1999.

[47] Bagdikian, pp. 182... 188; P. Clarke and E. Fredin, "Newspapers, Television, and Political Reasoning," Public Opinion Quarterly, 1978; M. Pfau, "A Channel Approach to Television Influence," Journal of Broadcasting and Electronic Media, 1990; D. T. Cundy, "Political Commercials and Candidate Image," in New Perspectives in Political Advertising (L. L Kai, et. al, Eds.); G. J. O'Keefe, "Political Malaise and Reliance on the Media," Journalism Quarterly, 1980; S. Becker and H. C. Choi, "Media Use, Issue/Image Discrimination," Communications Research, 1987; J. P. Robinson and D. K. Davis, "Television News and the Informed Public: An Information Process Approach," Journal of Communication, 1990; Slattrey, Karen L. Ernest A. Hakanen and Mark Doremus, "The Expression of Localism: Local TV news Coverage in the New Video Marketplace," *Journal of Broadcasting & electronic Media*, 40, 1996. Voakes, Paul S. Jack Kapfer, David Kurpius and David Shano-yeon Chern, "Diversity in the News: A Conceptual and Methodological Framework," *Journalism and Mass Communications Quarterly*, Autumn, 1996; Carroll, Raymond L. and C.A. Tuggle, "The World Outside: Local TV News Treatment of Imported News," *Journalism and Mass Communications Quarterly*, Spring 1997.

[48] Aufderheide, Cable, p. 55; D. Le Duc, Beyond Broadcasting ((New York: Longman, 1987); T. Streeter, "The Cable Fable Revisited; Discourse, Policy, and the Making of Cable Television," Critical Studies in Mass Communications, 1987; B. Winston, "Rejecting the Jehovah's Witness Gambit," Intermedia, 1990; N. M. Sine, et al., "Current Issues in Cable Television: A Re-balancing to Protect the Consumer," Cardozo Arts & Entertainment Law